have been remarked in other places in this formation.* In the same division also of the Wealden, at Cuckfield, is a bed of gravel or conglomerate, consisting of water-worn pebbles of quartz and jasper, with rolled bones of reptiles. These must have been drifted by a current, probably in water of no great depth.

Fig. 312.

Sphenopteris gracilis (Fitton), from the Hastings Sands near Tunbridge Wells.
a. A portion of the same magnified.

From such facts we may infer that, notwithstanding the great thickness of this division of the Wealden, the whole of it was a deposit in water of a moderate depth, and often extremely shallow. This idea may seem startling at first, yet such would be the natural consequence of a gradual and continuous sinking of the ground in an estuary or bay, into which a great river discharged its turbid waters. By each foot of subsidence, the fundamental rock would be depressed one foot farther from the surface; but the bay would not be deepened, if newly deposited mud and sand should raise the bottom one foot. On the contrary, such new strata of sand and mud might be frequently laid dry at low water, or overgrown for a season by a vegetation proper to marshes.

Area of the Wealden.—In regard to the geographical extent of the Wealden, it cannot be accurately laid down; because so much of it is concealed beneath the newer marine formations. It has been traced about 200 English miles from west to east, from the coast of Dorsetshire to near Boulogne, in France; and nearly 200 miles from northwest to southeast, from Surrey and Hampshire to Beauvais, in France. If the formation be continuous throughout this space, which is very doubtful, it does not follow that the whole was contemporaneous; because, in all likelihood, the physical geography of the region underwent frequent changes throughout the whole period, and the estuary may have altered its form, and even shifted its place. Dr. Dunker, of Cassel, and H. Von Meyer, in an excellent monograph on the Wealdens of Hanover and Westphalia, have shown that they correspond so closely, not only in their fossils, but also in their mineral characters, with the English series, that we can scarcely hesitate to refer the whole to one great delta. Even then, the magnitude of the deposit may not exceed that of many modern rivers. Thus, the delta of the Quorra or Niger, in Africa, stretches into the interior for more than 170 miles, and occupies, it is supposed, a space of more than 300 miles along the coast, thus forming a surface of more than 25,000 square miles, or equal to about one half of England.† Besides, we know not, in such cases, how far the fluviatile sediment and organic remains of the river and the land may be carried out from the coast, and spread over the bed of the sea. I have shown, when treating of the Mississippi, that a more ancient delta, including

* Mantell, Geol. of S. E. of England, p. 244.
† Fitton, Geol. of Hastings, p. 58; who cites Lander's Travels.